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Remarks

Claims 1-42 are pending in the application.

Claims 16, 25-28, 30-34, and 40 were indicated to contain allowable subject matter but were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The drawings were objected to.

Claim 2-17, 19-41 and 44 (40) were objected to because of various informalities.

Claims 9, 10, 39, and 42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1-10 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent Publication No. US 2002/0126741 A1 of Baum et al. in view of United States Patent No. 6,795,508 issued to Odenwalder et al.

Claims 11-14 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baum et al. in view of Odenwalder et al. in further view of United States Patent No. 6,731,700 issued to Yakhnich et al. on May 4, 2004.

Claims 18-24, 29, 35-39, 41, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baum et al. in view of Yakhnich et al. and Odenwalder et al.

Each of the various rejections and objections are overcome by amendments that are made to the specification, drawing, and/or claims, as well as, or in the alternative, by various arguments that are presented.

Any amendments to any claim for reasons other than as expressly recited herein as being for the purpose of distinguishing such claim from known prior art are not being made with an intent to change in any way the literal scope of such claims or the range of equivalents for such claims. They are being made simply to present language that is better in conformance with the form requirements of Title 35 of the United States Code or is simply clearer and easier to understand than the originally presented language. Any amendments to any claim expressly made in order to distinguish such claim from known prior art are being made only with an intent to change the literal scope of such claim in

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the most minimal way, i.e., to just avoid the prior art in a way that leaves the claim novel and not obvious in view of the cited prior art, and no equivalent of any subject matter remaining in the claim is intended to be surrendered.

Also, since a dependent claim inherently includes the recitations of the claim or chain of claims from which it depends, it is submitted that the scope and content of any dependent claims that have been herein rewritten in independent form is exactly the same as the scope and content of those claims prior to having been rewritten in independent form. That is, although by convention such rewritten claims are labeled herein as having been "amended," it is submitted that only the format, and not the content, of these claims has been changed. This is true whether a dependent claim has been rewritten to expressly include the limitations of those claims on which it formerly depended or whether an independent claim has been rewriting to include the limitations of claims that previously depended from it. Thus, by such rewriting no equivalent of any subject matter of the original dependent claim is intended to be surrendered. If the Examiner is of a different view, he is respectfully requested to so indicate.

Objection to the Drawing

The drawings were objected to, the Office Action stating that the output of the receiver front-end 107 does not produce a stream of binary numbers as described in FIGs. 1 and 5. Applicants have amended the specification to overcome the objection to the drawings. More specifically, the specification as amended now recites that receiver front-end 107 operates conventionally to produce a plurality of streams of binary numbers, each stream representing samples of the radio signals received at an associated one of antennas 105. Thus, the specification has been clarified to be in better conformance with the drawing. No correction of the drawing is necessary.

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Claim Objections

Claim 2-17, 19-41 and 44 were objected to because of the following various informalities.

Regarding claims 2-17, and 19-41 the Office Action suggests that in claims 2-17 and 19-21 the recited phrase "The invention as defined in claim..." should be changed, in claims 2-17 to "The method as defined in claim...", and in claims 19-21 to "The receiver as defined in claim...".

This objection is respectfully traversed.

Applicants respectfully point out there is no requirement to point out applicants' invention in the manner suggested by the Office Action. Instead, since 37 C.F.R. 1.75 states that the claim points out the subject matter that applicant regards as his invention, it is necessary that a claim define an invention, and so it is often said, "the claim is the invention". Thus, the language objected to is clear and legally correct, since only dependent claims employ the language and each refers back to another claim which defines an invention. Moreover, many patents have issued with the exact language objected to by the Office Action, indicating that the United States Patent and Trademark Office regards such language as an acceptable form. See for example, the relatively recently issued United States Patents Nos. 5,764,748, 5,784,448, 5,767,751, and 5,767,825.

Claims 30, 31 and 33 have been amended to conform with the suggestions of the Office Action. As part of correcting the aforementioned claims, applicants became aware of some similar minor corrections and clarifications that were required by claim 32, and they have so corrected claim 32.

As to the objection to claim 44, applicants note that there is no claim 44. However, applicants believe that the Office Action intended to refer to claim 40, based on the elements cited in the Office Action regarding claim 44. Applicants have amended claim 40 to include a definition of $y(k)$. Claim 40 already includes the definition of H , which is Hermetian.

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Rejection Under 35 U.S.C. 112, Second Paragraph

Claims 9, 10, 39, and 42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 9 and 10, the Office Action states that the phrase "transmit antennas transmit antennas transmit" is unclear. Applicant has corrected the typographical error so that claims 9 and 10 so that it now correctly recites "transmit antennas transmit".

Regarding claim 39, the Office Action states that the phrase "said joint minimum mean square error (MMSE) equalizer solution" lacks antecedent basis. Applicants have changed claim 39 to depend from claim 19, which provides proper antecedent basis. Applicants have also changed the dependencies of claims 37 and 38 to depend from claim 18. There is believed to be sufficient antecedent basis in claim 18 for each of these changes.

As to claim 42, the Office Action states that the phrase "said joint equalizer output" lacks antecedent basis. Applicants have amended claim 42 to clarify it, such clarification including eliminating the need for the phrase "said joint equalizer output" and to providing antecedent basis for the phrase "output signal".

Rejection Under 35 U.S.C. 103(a)

Claims 1-10 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent Publication No. US 2002/0126741 A1 of Baum et al. in view of United States Patent No. 6,795,508 issued to Odenwalder et al. The Office Action states that Baum et al. teaches all of the elements of applicants' claimed invention, except that the transmitted signals are transmitted over u antennas. (Note: applicants are not really sure what is meant by u antennas). In particular, regarding the joint equalizer element of applicants' claims, the Office Action specifically points out element 330 of Baum et al. and page 5, sections 0053, 0054, and 0058 thereof. However, continues the Office Action, this element is taught by Odenwalder et al., such that one of ordinary skill in the art would readily combine Baum et al. and Odenwalder et al. to arrive at applicants' invention.

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This ground of rejection is respectfully traversed for the following reasons.

Applicants' claims recite determining a joint equalizer solution using channel information for at least one pairing of at least one of the transmit antennas and the receive antennas. However, Baum et al. does not teach determining such a joint equalizer solution. Instead, Baum et al. teaches that each receive antenna employs its own separate equalization unit. Note that in Baum et al. there is a separate element 330 for each branch, with the number of branches corresponding to the number of receive antennas. By contrast, applicants invention employs only a single, joint equalization element which operates on the signals received from all of the antennas together.

Note that such a joint equalizer is not equivalent to simply putting a box around all of the elements 330 of Baum et al. Such a construct is not a joint equalizer, since the signals from each receive antenna is processed separately therein. Furthermore, applicants' joint equalizer produces a number of output streams based on the number of transmit antennas. By contrast, in Baum et al., there is one equalized output stream for each receive antenna.

Thus, Baum et al. does not teach or suggest determining a joint equalizer solution using channel information for at least one pairing of at least one of the transmit antennas and the receive antennas, as required by applicants claims 1-10 and 15.

Claims 11-14 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baum et al. in view of Odenwalder et al. as applied to claim 1 as described hereinabove in further view of United States Patent No. 6,731,700 issued to Yakhnich et al. on May 4, 2004.

This ground of rejection is respectfully traversed, since it pertains only to dependent claims of claim 1 and relies on the rejection of claim 1 based on Baum et al. in view of Odenwalder et al. that was traversed hereinabove, and the Office Action makes no showing that Yakhnich et al. it teaches or suggests the element of a joint equalizer solution that was shown herein to be missing from that combination.

Claims 18-24, 29, 35-39, 41, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baum et al. in view of Yakhnich et al. and Odenwalder et al.

This ground of rejection is respectfully traversed for the following reasons.

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Each of independent claims 18 and 42 contains a limitation similar to that of claim 1 which requires determining a joint equalizer solution using channel information for at least one pairing of at least one of the transmit antennas and the receive antennas. As noted hereinabove, none of the cited references teaches or suggests such an element. Therefore, independent claims 18 and 42 are allowable over the proposed combination.

Since all of the dependent claims that depend from independent claims 1, 18 and 42 include all the limitations of the respective independent claim from which they ultimately depend, each such dependent claim is also allowable over Baum et al., Yakhnich et al. and Odenwalder et al., or any combination thereof, under 35 U.S.C. 103.

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Conclusion

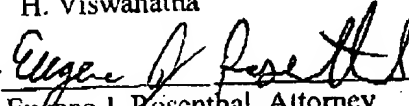
It is respectfully submitted that the Office Action's rejections have been overcome and that this application is now in condition for allowance. Reconsideration and allowance are, therefore, respectfully solicited.

If, however, the Examiner still believes that there are unresolved issues, he is invited to call applicant's attorney so that arrangements may be made to discuss and resolve any such issues.

In the event that an extension of time is required for this amendment to be considered timely, and a petition therefor does not otherwise accompany this amendment, any necessary extension of time is hereby petitioned for, and the Commissioner is authorized to charge the appropriate cost of such petition to the **Lucent Technologies Deposit Account No. 12-2325**.

Respectfully,

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By 
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